

AMENDMENTS TO THE DRAWINGS

The attached sheet(s) of drawings includes changes to Figures 13A, 13B and 13C.

Attachment: Replacement sheet
 Annotated sheet showing changes

REMARKS

This paper is responsive to the Office Action mailed August 25, 2006, in which the Examiner rejects pending claims 1-27. Claims 1, 10 and 19 have been amended.

At paragraph 3 of the Office Action, the Examiner objects to the drawings under 37 CFR 1.84(h)(5) because Figures 12, 13B and 13C show modified forms of construction in the same view. The Applicant believes the objection to Figure 12 should be to Figure 13A, based on the Examiner's description of the objection. Accordingly, the Applicant submits new drawings for Figures 13A, 13B and 13C, so those objections should be withdrawn. The specification has been amended to be consistent with the drawing changes.

At paragraph 4 of the Office Action, the Examiner objects to the disclosure regarding paragraph [0083]. The specification has been amended to overcome this objection, so those objections should be withdrawn.

At paragraph 6 of the Office Action, the Examiner rejects claims 1, 2, 8-11, 17-20, 26 and 27 under 35 U.S.C. 102(b) as being anticipated by Zheng (Zheng et al., "PA-RISC to IA-64 Transparent Execution, No Recompile," IEEE, March 2000. Claims 1, 10 and 19 have been amended to overcome this rejection. Claim 1 has been amended as follows:

- I. The introductory portion of the claim has been amended to specify that the method in question comprises a method of selectively interpreting or translating program code. This clarifies the nature of the claimed method, as one that will sometimes translate or sometimes selectively interpret.
- II. The introductory portion of the claim has been amended to give some information regarding the computing environment in which the method operates, which aids understanding of the claim. In particular, the concepts of subject processor and target processor aid understanding, as does the amendment to recite that the method operates on instructions from the instruction set of the subject processor.

III. The interpreter described in the claim is now referred to as a "simple interpreter", being capable of interpreting only a subset of instructions from the instruction set of the subject processor.

IV. The conditional steps in the claim have been amended to make it clear that a choice is made to interpret the program code if the program code contains only instructions in the subset that the interpreter is capable of handling, or otherwise translating the program code.

In Zheng, the cited passage on page 48, under the heading "Interpreter" makes it clear that the interpreter in Zheng is capable of interpreting all instructions in the instruction set of the subject processor - "The...interpreter is the emulation safety net because it handles all possible blocks..." [emphasis added]. Zheng does not teach or suggest the element of claim 1 concerning the choice of which program code is to be interpreted.

For at least these reasons, claim 1 as amended is novel over Zheng, so this rejection should be withdrawn. Corresponding amendments have been made to the other independent claims, so by like reasoning those rejections should also be withdrawn. The rejections to dependent claims 2, 8, 9, 11, 17, 18, 20, 26 and 27 should be withdrawn, since those claims depend from allowable claims as described above.

At paragraph 8 of the Office Action, the Examiner rejects claims 4-7, 13-16 and 22-25 under 35 U.S.C. 103(a) as being unpatentable over Zheng in view of Warnes (Peter Warnes, US Patent No. 7,051,189B2. As described above, claims 1, 10 and 19 have been amended to include a limitation not taught or suggested by Zheng. Warnes does not supply that which is missing from Zheng, so claims 1, 10 and 19 as amended should be allowable. Since dependent claims 4-7, 13-16 and 22-25 depend from allowable claims 1, 10 and 19, those claims should also be allowable.

Further, the pending claims relate in general to the field of program code conversion. That is, the field of taking program code made up of instructions from one instruction set, and executing that program code using a processor that may not otherwise be able to understand those instructions. The person of ordinary skill here is skilled in the art of software engineering.

In our view the Warnes document is not in this field. As stated in column 1, lines 49-52, Warnes is in the field of integrated circuit design, in particular in the field of design of pipelined CPUs and user-customizable microprocessors. This is reinforced in *e.g.*, columns 13, line 55 onwards, which discloses improvements in the design and synthesis of CPUs and related hardware.

The differences between these technical fields is significant. We submit that the person of ordinary skill in software engineering would not have turned to Warnes when considering improvements to the teaching of Zheng.

In fact, the teaching of Warnes is so specific in nature that even if the skilled software engineer were to look at Warnes we believe he would not be able to turn the details of instruction set compression into anything useful in the field of program code conversion. The software engineer working in the field of program code conversion is not able to modify the hardware on which his software will run. Furthermore, the software engineer working in the field of program code conversion is not able to modify the instruction set for the processor on which his software will be run. Modifications of these kinds are integral to the teaching of Warnes.

We submit that faced with the direct teaching of Zheng in which the interpreter "is the emulation safety net because it handles all possible blocks" it is not simply possible to arrive at the teaching of the invention as now claimed by adding in material from Warnes relating to dividing an instruction set. The person of ordinary skill considering compressing the instruction set in Zheng would apply any such compression in the translator - continuing along the line suggested by Zheng in relation to the non-translation of "bad blocks". However, this would not be any use to the translator in Zheng, which is constrained to run on given target hardware.

In fact, the application describes a system which operates quite differently to the Zheng system, and which can offer certain advantages in terms of performance and memory saving. These advantages are discussed in general terms from page 20 of the published application, but we will set out more detail here, in particular in relation to why the pending claims provide an inventive development over the Zheng system.

By providing a simple interpreter which can only interpret a subset of the instructions from the instruction set of the subject processor, the code employing the claimed method can start up very quickly in comparison with code capable of interpreting all possible instructions in the instruction set of the subject processor.

By carefully selecting the instructions in the subset the improvements in start up performance and overall speed can be maximized. For example, when the method commences, it is likely to encounter subject code for loading libraries, and performing other preparatory work. This code is unlikely to be encountered again, but is likely to only comprise a small number of instructions from the subject instruction set. The Examiner will therefore appreciate that the present invention therefore offers improved start up performance over the Zheng system.

In addition, the pending claims offer the possibility of improved performance over Zheng when dealing with portions of the subject code that it may not be desirable to translate. The present invention can perform a simple check of the instruction in the program code, before commencing interpreting dependent on the content of the code. This means that by including certain instructions in the subset, such as those instructions relating to "trampolines," the decision not to translate the code including those instructions becomes automatic, without the need for a further checking step. In contrast, Zheng requires a separate and more complex procedure for identifying and dealing with "bad blocks" so that these blocks are not translated.

In summary, Applicant submits that the Zheng and Warnes documents would not be combined, and even if combined they do not teach or suggest all of the limitations of the pending claims as amended.

Filed herewith is a Request for a Two-Month Extension of Time, which extends the statutory period for response to expire on January 25, 2007. Accordingly, Applicant respectfully submits that this response is being timely filed.

In view of the above amendment, applicant believes the pending application is in condition for allowance. No other fees are believed to be due in connection with the filing of this response, however the Commissioner is authorized to debit Deposit Account No. 08-0219 for any required fee necessary to maintain the pendency of this application.

Application No. 10/732,764
Amendment dated January 25, 2007
Reply to Office Action of August 25, 2006

Docket No.: 1801270.00135US1

Respectfully submitted,

Dated: January 25, 2007

A handwritten signature in black ink, appearing to read 'R. Demsher', written over a horizontal line.

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Attachments

FIG. 13A

Subject Code

200

```
LABEL1  r3 := LOAD(r2 + 24)
        r1 := r1 -1
        CMP r1 0
        BC LABEL1
        STORE 16(r5) r3
```

FIG. 13B

Group Block

202

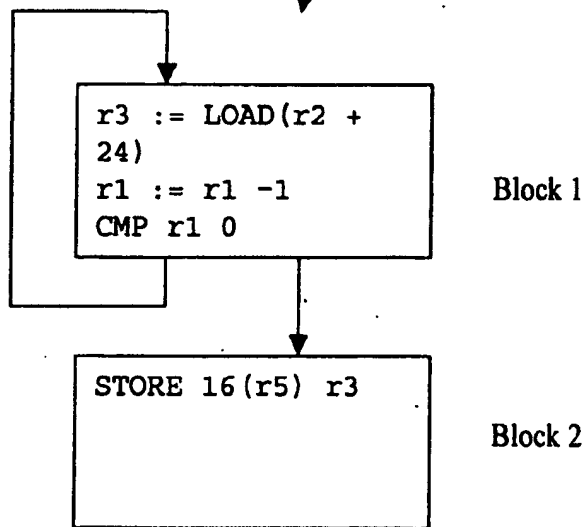


FIG. 13B

Block 1 IR Without Lazy Byteswapping

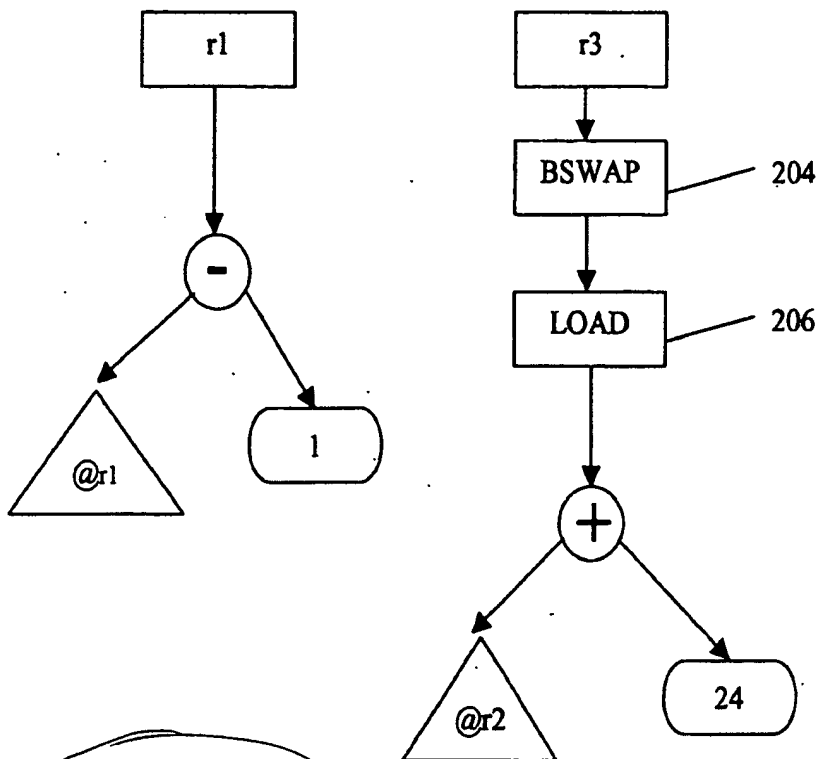


FIG. 13D

Block 2 IR Without Lazy Byteswapping

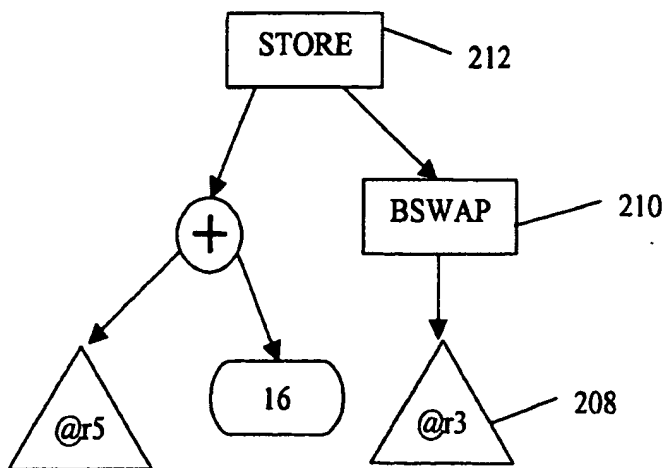


FIG. 13C

FIG. 13F

Block 2 IR With Lazy Byteswapping

